



**PATENT APPLICATION**

**RESPONSE UNDER 37 CFR §1.116  
EXPEDITED PROCEDURE  
TECHNOLOGY CENTER ART UNIT 3726**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Alexander Jan Carel DE VRIES et al.

Group Art Unit: 3726

Application No.: 10/080,714

Examiner: T. Nguyen

Filed: February 25, 2002

Docket No.: 105531.01

For: METHOD OF MANUFACTURING A ROLLING ELEMENT BEARING WITH  
IMPROVED ROLLING CONTACT SURFACES

**REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION**

Director of the U.S. Patent and Trademark Office  
Washington, D.C. 20231

Sir:

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**JUL 14 2003**

**GROUP 3500**

In reply to the January 7, 2003 Office Action, the shortened statutory period for reply being extended by the attached Petition for Extension of Time, Applicants respectfully request reconsideration of the application in view of the following remarks.

Claims 1, 2 and 4-6 are pending.

The Office Action rejects claims 1-2 and 4-6 under 35 U.S.C. §103(a) as being unpatentable over JP 04321816 to Toru in view of U.S. Patent 5,592,840 to Miyasaka. This rejection is respectfully traversed.

Neither Toru nor Miyasaka teach, suggest, or would have rendered obvious, all of the features recited in claim 1. In particular, none of the applied references teach or suggest a method of forming recesses by shot peening at least one of its surfaces, wherein "an average angle  $\alpha$  between a wall of each recess on the at least one surface is less than 5 degrees," as recited in claim 1.

The Office Action correctly admits that Toru fails to teach or suggest: 1) forming the recesses by shot peening; and 2) that an average angle between a wall of each recess on the at least one surface is less than 5 degrees. See the Office Action at, e.g., page 2, paragraph 4.

Toru discloses a surface 11 having a certain roughness provided with tiny recesses which contain oil. As a result, oil film formation of the surface is promoted. See, e.g., the Abstract of Toru. Toru is absolutely silent about any angle of any one of its recesses, let alone any angle being formed with less than 5 degrees with respect to any one surface, as recited in claim 1.

Miyasaka fails to cure the deficiencies of Toru discussed above with respect to claim 1. Miyasaka discloses that a portion of a metal product is subjected to a sliding action. See, e.g., the Abstract of Miyasaka. In particular, the plain bearing of Miyasaka is concerned with a sliding action, not a rolling contact.

One of ordinary skill in the rolling bearing art would have understood that a sliding action is not the phenomenon which is of importance in a rolling bearing; to the contrary, it is the ability to roll. That is because the problems which occur in a rolling element bearing are quite different from the problems which occur in a plain (sliding) bearing. For instance, in plain bearings fatigue does not play a role. Further, in plain bearings, no concentrated loads occur due to the fact that the surfaces of a plain bearing are in sliding contact with each other over a large surface area.

In the roller bearings art, however, there is a drastic difference between the limited area of contact between a ball or roller, and the rest of the area which does not have such contact. Thus, the surfaces of the components of a roller element bearing are subjected to largely varying forces, which lead to fatigue problems. Moreover, the stresses which occur in a rolling element bearing are much higher than those which occur in a plain (sliding) bearing. Thus, one skilled in the art who was devising a rolling bearing element would not have

looked to the disclosure of Miyasaka which clearly relates only to plain bearings sliding over surfaces.

One skilled in the art would have understood that a "smooth" surface has favorable fatigue properties. Thus, the formation of indentations in a rolling element bearing surface (with the goal of containing oil), goes at the expense of fatigue properties thereof.

Accordingly, the claimed invention provides a favorable solution by providing small indentations on at least one of the surfaces of the roller element bearing by the process of shot-peening. Thereby, compressive stresses are generated in the rolling element bearing surface and favorable lubrication conditions are also obtained. Moreover, by limiting the indentations to less than 5 degree embodiments, fatigue properties are hardly influenced.

One of ordinary skill in the art would not have combined the teachings of Toru and Miyasaka to arrive at the Applicants' claimed invention as Toru and Miyasaka are from two substantially different technologies having substantially different purposes. An attempt to combine these two teaching would render a final product inefficient and/or inoperable.

For at least the reasons discussed above, Applicants respectfully submit that neither Toru nor Miyasaka anticipate, or render obvious, all of the subject matter of claim 1.

Accordingly, the applied references also fail to anticipate the subject matter of claims 2 and 4-6, which depend from claim 1. Withdrawal of the rejection under 35 U.S.C. §103(a) is therefore respectfully solicited.

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-2 and 4-6 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,



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Attachment:  
Petition for Extension of Time

Date: April 17, 2003

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